

Studying the Z Boson with the ATLAS Detector at the LHC – F93/94 Remote Lab Course –

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0 Updates to this document

May 2024 Introduction of lab courses F93/94 as remote versions of F91/92.

1 Introductory remarks

The lab courses F93/94 were introduced during the summer semester 2024 as remote versions of the existing lab courses F91/92, “Studying the Z Boson with the ATLAS Detector at the LHC”. Instead of working directly in front of the PCs in the lab course building, you will set up a remote connection from your private PC or laptop to the [KIP CIP-Pool](#). To establish the remote connection we are using the Linux remote desktop application [ThinLinc](#). It is possible to either install the ThinLinc client on your personal computer, or alternatively to use a web client. When using the native client, you will need to establish a VPN connection to the [URZ](#). For the supervision by the tutors and the discussion amongst students during the lab course we are using the [heiCONF](#) web conferencing system.

In contrast to the non-remote lab course F91/92 in which both students of one group work together in front of the same computer in the lab course building, for the remote lab course F93/94 you have the choice to either meet and work together in front of one local computer, or each student establishes her or his own remote connection. In either case, team work is not only allowed but highly recommended, and the development of only one common coding solution is sufficient. The heiCONF system offers screen sharing which can be used for active cooperation during the remote lab course.

The **main manual** for the F93/94 lab course is **identical to the F91/92 manual** which can be downloaded from the advanced lab [instructions website](#). In the following, technical details specific to the F93/94 remote lab course will be explained.

2 Web conferencing for supervision and discussion

A heiCONF meeting room is set up for supervision and discussion during the remote lab course. Your tutor will open this meeting room at defined times during the day and she or he will communicate this to you beforehand. During these times you and your partner will work on the lab course, either each person remotely from her or his own computer, or jointly in front of one local computer. The tutor will be available for discussions and questions via the web conference. If the daily work time has passed, the meeting will be closed. The heiCONF **meeting url** can be found in the **confirmation email** which you receive when booking this lab course.

3 Establishing the ThinLinc remote connection

ThinLinc is a fast remote desktop system, which allows you to work from home as if you were in front of the remote PC itself. Connecting remotely to the CIP-Pool servers can be done either via the web client offered by KIP, or by installing the native ThinLinc client. Instructions for both cases can be found at <https://wiki.kip.uni-heidelberg.de/KIPwiki/index.php/EDV:CIP-Pool/RemoteZugang#thinlinc>.

When using the native ThinLinc client, you will have to establish a VPN connection to the URZ first. A virtual private network (VPN) extends a private network across a public network, and allows the user to establish secure access from her or his local network e.g. at home into the private network. The URZ supports the Cisco AnyConnect VPN Client, which students can download for free. Detailed instructions how to download and install the client can be found at <https://www.urz.uni-heidelberg.de/en/vpn>.

After having established the remote connection, either via the web client or via the native client, you will be presented the ThinLinc profile selector window as shown in Figure 1. We recommend to select the **Xfce-Desktop** environment. Xfce aims to be fast and lightweight while still being visually appealing and easy to use.

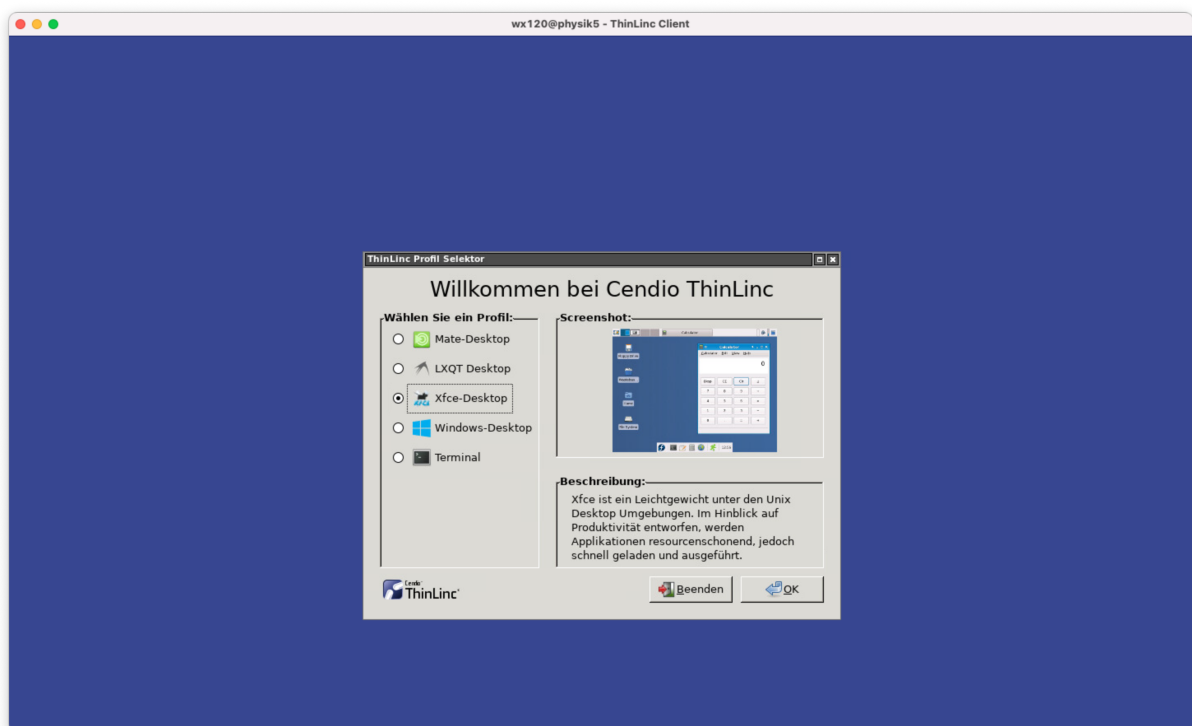


Figure 1: ThinLinc profile selector window when connecting to a PC in the KIP CIP-Pool.

4 Differences to the F91/92 instructions

On the CIP-Pool PCs, the data for the lab course are stored in a different location than described in the main F91/92 lab course manual. In addition, different versions of ROOT and python are set as default. Therefore the working environment has to be adjusted before executing the lab course scripts as described in the main manual.

On the CIP-Pool PCs, the data for this lab course are stored under **/local/fp9192/data** instead of **/fp/data** as for the F91/92 lab course PCs. Hence, when the main manual refers to **/fp/data**, always use **/local/fp9192/data** instead.

The correct versions of ROOT and python for the lab course can be configured by sourcing a little shell script. To do so, execute the following command each time you open a new terminal window. You should see an output as shown in Figure 2.

```
$ source /local/fp9192/data/Setup/.bash_pool
```

To avoid having to execute this command each time a new terminal window is opened, we recommend to put this command into your **.bashrc** file or, preferably, into your **.bash_aliases** file which both are located in your home directory. To do so, open the file with your preferred text editor and insert the command. Note that while a **.bashrc** file should already exist, it might be that you have to create the **.bash_aliases** for the first time. In case you changed your default shell to something different than bash, we assume you know what you are doing and find the corresponding setup scripts yourself.


A screenshot of a terminal window titled 'wx120@physik2: ~'. The window shows a series of commands and their outputs. The user enters 'source /local/fp9192/data/Setup/.bash_pool'. The output shows 'Setting up FP 93/94 CIP pool environment:', 'Setting ROOT version to 6.22.02', and 'Setting python version to 3.7'. The prompt returns to 'wx120@physik2:~\$'.

Figure 2: Setting up the CIP-Pool environment.

5 Copying result data

In order to be able to include result plots into your lab course report or seminar talk, you need to copy them to your local computer. We recommend to use the URZ [heiBOX](https://www.urz.uni-heidelberg.de/en/heibox) service for this purpose.

heiBOX is a secure file hosting service available for free to all students, offering 10 GB storage space for each student. It can be used to exchange and synchronize files on PCs and mobile devices, providing a similar functionality to commercial cloud storage services such as Dropbox or Google Drive.

To transfer data from the remote PC to your local computer, open a web browser (e.g. firefox) in the ThinLinc session on the remote PC. Use the heiBOX web interface (login via UniID) to upload the data you want to transfer. On your local computer, you can again use the heiBOX web interface to download the data, or install the Seafiler client for automatic syncing.

Detailed information as well as links to the heiBOX web interface and client download page are provided at <https://www.urz.uni-heidelberg.de/en/heibox>.